

20.309 Schedule for Fall 2008

<u>LAB</u>	
	Lecture 1: Course Overview <i>Electronics</i> Lecture 2: Voltage dividers and electrical impedance <u>Reading:</u> H&H p. 3-24 Lecture 3: Capacitors and RC circuits <u>Reading:</u> H&H p. 32-35 and 6.002 notes p. 703-718, 993-1004 Lecture 4: Transfer Functions and RC filters <u>Reading:</u> H&H p. 37-40, 46-53 6.002 notes p. 1004-1012, 1030-1054 Lecture 5: Thermodynamics of DNA melting <u>Reading:</u> SantaLucia, p. 1460-1462 Lecture 6: Feedback and Amplifiers I Quiz #1 on Lab #1, pI <u>Reading:</u> H&H p. 163-176 and 6.002 notes p. 1185-1191 Lecture 7: Feedback and Amplifiers II <u>Reading:</u> 6.002 notes p. 1191-1220 Lecture 8: The Reality of Amplifiers <u>Reading:</u> TBA <i>Signals and Systems</i> Lecture 9: Intro to Fourier Analysis Quiz #2 on Lab #1, pII <u>Reading:</u> Strang p. 263-275, 309-315 Lecture 10: Power Spectral Density, Noise and Bandwidth <u>Reading:</u> Press p. 496-500 (on PSD) Lecture 11: Sampling and Discrete Analysis <u>Reading:</u> Tutorial and Press p. 500-504 and Lecture 12: Convolution <u>Reading:</u> Seung notes (except Sections 3,5,7,8) Lecture 13: Application of Convolution Theorem <u>Reading:</u> none DEMO: Thermal Measurement Laboratory <u>Reading:</u> Lab Module #2 Lecture 14: Mechanical Systems Quiz #3 on Lab #2 <u>Reading:</u> Strang p. 316-320 Lecture 15: Ultimate limits of force and position detection <u>Reading:</u> none Student presentations 1 Lab #1 Due DEMO: Laser Safety, Student presentation 2 <u>Reading:</u> Lecture 16: Optics and Microscopy I <u>Reading:</u> Hecht 2.1-2.9, 4.1-4.5, 5.1-5.3 Lecture 17: Optics and Microscopy II <u>Reading:</u> Hecht 7.1, 7.3, 9.1, 9.3 Lecture 18: Optics and Microscopy III <u>Reading:</u> Hecht 10.1, 10.2.1, 10.2.5, 10.2.6 Lecture 19: Optics and Microscopy IV Quiz #4 <u>Reading:</u> Hecht 13.1-13.1.4 Optical Construction; Student presentation 3 Lab #2 Due Lecture 20: Optoelectronics I <u>Reading:</u> Masters & So 12.1-12.5.7
0. Intro to Electronics	Thurs, September 4
	Fri, September 5
	Tues, September 9
	Thurs, September 11
	Fri, September 12
1. DNA Melting	Tues, September 16
	HW #1 Due
	Thurs, September 18
	Fri, September 19
	Tues, September 23
	HW #2 Due
	Thurs, September 25
	Fri, September 26
	Tues, September 30
	HW #3 Due
	Thurs, October 2
	Fri, October 3
2. Thermal Measurement	Tues, October 7
	HW #4 Due
	Thurs, October 9
	Fri, October 10
	Tue, October 14
	HW #5 Due
	Thurs, October 16
4.	Fri, October 17
	Tues, October 21
Fluorescence Microscopy	Thurs, October 23
	Fri, October 24
	Tue, October 28
	HW #6 Due

<u>Lecture 21: Optoelectronics II</u>	Quiz #5	Thurs, October 30
<u>Lecture 22: Optoelectronics III</u>		Fri, October 31
<u>Lecture 23: Image Processing I</u>		Tue, November 4
<u>Reading:</u> Gonzalas & Wood 4.1-4.4, 8.4.1-8.4.2		
<u>Lecture 24: Image Processing II</u>		Thurs, November 6
<u>Reading:</u> Gonzalas & Wood 7		
Student Presentation 4		Fri, November 7
HW #7 Due		Wed, November 12
<u>Lecture 25: Fluorescence spectroscopy I</u>		Thurs, November 13
<u>Reading:</u> Cantor & Schimel 8.2, p.433-444, Lakowicz, 1.1-1.6		
<u>Lecture 26: Fluorescence spectroscopy II</u>	Lab #3 Due	Fri, November 14
<u>Reading:</u> Cantor & Schimel 8.2, p.444-465, Lakowicz, 3.1-3.7		
<u>Lecture 29: Advanced Fluorescence Microscopy I: Resolution</u>		Tue, November 18
<u>Reading:</u> Hell, Nat. Biotech, 2003, Rust, Nat. Meth. 2006	HW #8 Due	
Student Presentation 5		Thurs, November 20
<u>Lecture 30: Advanced Fluorescence Microscopy II: Biochemistry</u>		Fri, November 21
<u>Reading:</u> Kim, Nat. Meth. 2007, Jares-Erijman, Nat. Biotech., 2003		
Student Presentation 6		Tue, November 25
<u>Lecture 31: 3D Microscopy I: Confocal</u>		Tue, December 2
<u>Reading:</u> Pawley, 1		
<u>Lecture 32: 3D Microscopy II: Multiphoton</u>		Thurs, December 4
<u>Reading:</u> So, Ann Rev 2000, p.400-410, 414-418		
<u>Lecture 33: 3D Microscopy III: Demo</u>		Fri, December 5
Student Presentation 7		Tue, December 9
	Lab #4 Due	Fri, December 10